

ASSESSMENT OF CARBON AND NON-CARBON BENEFITS OF TROPICAL HOMEGARDENS IN RELATION TO NATURAL FORESTS FOR REDD-RELATED ACTIVITIES IN SRI LANKA

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ABSTRACT

Sri Lanka's natural forests are rich in biological diversity and endemic species of flora and fauna and are critical for soil conservation, watershed and flood control. The conservation, protection and sustainable management of these forests has motivated Sri Lanka to engage in REDD+ activities through the UN-REDD program. Another important land use system for meeting climate and development goals as well as for enhanced agricultural productivity is tropical homegardens. This ancient and locally adapted agroforestry system is presently estimated to occupy nearly 15 % of the land area in Sri Lanka and is described in the scientific literature to support ecosystem services and food security.

Several field campaigns were conducted in the recent past across Sri Lanka using both qualitative and quantitative methods to assess carbon and non-carbon benefits of natural forests and homegardens. Results showed that mean carbon stocks in the aboveground biomass across natural forest types in Sri Lanka range from 22-181 Mg C per ha with open forests having the lowest stock and lowland wet evergreen forests the highest carbon stock. The wide range in above ground carbon stocks between and among forest types reflects variations in species diversity, stand structure and age, tree density, environment and human disturbance. Estimates also showed that homegardens may contain a significant portion of the total above ground biomass carbon stock in the terrestrial system in Sri Lanka (wet zone: 87 Mg C ha⁻¹; dry zone: 35 Mg C ha⁻¹), increasing from almost one-sixth in 1992 to nearly one-fifth in 2010.

Policy measures could be formulated to allow degraded, logged, and secondary forests to regrow into a mature state, which could help maintain carbon stocks while sustaining ecosystem services and providing non-carbon benefits from forests. Another measure that could help decision makers to maintain and enhance carbon stocks while promoting ecosystem services, would be to promote establishment of homegardens through intensification or extensification on marginal lands and serve as important buffers for the remaining natural forests in areas that are experiencing pressure from increasing populations.

There are also multiple merits of homegardens in providing food security and environmental services, but a recent systematic review show that many studies are descriptive and only provide location-specific information on plant species, yield and management while making few comparisons with forests or other production systems, and even less is there empirical evidence and quantification of the food security benefits. Therefore, more scientific studies on valuation of overall ecosystem services especially on homegardens are needed taking a landscape approach to monitor the role of food security in relation to synergies and tradeoffs with climate and development goals while promoting the community based sustainable management and conservation.

Keywords: agroforestry, production, management, ecosystem services, carbon